

Preliminary Amendment re: 09/933.743

Amendments to the Specification

Please amend paragraph [0019] as follows:

A1  
[0019] where the system comprises an electrochemical battery, the calibration system comprises a calibration battery, and the characteristic comprises a state of health of the battery, providing the prototype set of fuzzy logic membership functions may comprise determining a chemistry type of the battery and selecting from a plurality of prototype sets of fuzzy logic membership functions a the prototype set of fuzzy logic membership functions which match matches the chemistry type of the battery.

Please add, immediately following paragraph [0020] the following new paragraph:

A2  
[0020.1] Another aspect of the invention provides a method for training a system to produce an output indicative of a characteristic of a test system in response to a plurality of parameter values of the test system, the method comprising:

- a) providing a prototype set, the prototype set comprising a plurality of functions, each one of the functions corresponding to a corresponding one of the parameters;
- b) obtaining calibration parameter values from a calibration system for which the characteristic has a known value;
- c) for each of the calibration parameter values obtained from the calibration system, obtaining a system-specific set of functions comprising a plurality of scaled functions obtained by scaling the corresponding plurality of functions; and
- d) using the system-specific set of functions to produce the output.

Please amend paragraph [0060] as follows:

A3  
[0060] In the preferred embodiment described herein, each group of rules corresponds to one of the definitional consequent membership values in a monotonically ordered set

Preliminary Amendment re: 09/933,743

Page 3 of 15

Q3  
Contd.  
throughout the desired range of output values from 50 to 100%. This set of definitional consequent membership values {50, 56.25, 62.5, 68.75, 75, 81.25, 87.5, 93.75, 100} is shown as definitional consequent membership values ~~711A~~ 712A through ~~711I~~ 712I in Figure 7.

Please amend paragraph [0071] as follows:

A4  
[0071] The calibration battery is then primed (block 806). Priming repeatedly cycles the calibration battery until its maximum capacity is reached. While priming is fairly time consuming it permits the capacity of the calibration battery to be reliably assessed. The capacity of the battery can be determined by charging the battery and then timing the discharge of the battery. The actual SoH is assumed to be directly related to the battery's capacity. Preferably the first calibration battery is a brand new battery which can be assumed to have a SoH of 100%. The SoH of other calibration batteries having different capacities can then be determined as follows:

$$SoH_{RM} = \frac{C_{RM}}{C_{BM}} \times 100\% \quad (3)$$

where  $C_{RM}$  is the reliably measured capacity of a calibration battery, and  $C_{BM}$  is the reliably measured capacity of a new calibration battery which is assumed to have a SoH of 100%.  $C_{BM}$  may be called a "benchmark capacity".

Please amend paragraphs [0075] and [0076] as follows:

A5  
[0075] Preferably the model-specific matrix shown in Table II also stores the values of calibration counters and an epoch counter. Table V IIIa is an example of stored values of calibration counters and an epoch counter.

Preliminary Amendment re: 09/933.743

Page 4 of 15

Table V IIIa - Example Calibration and Epoch Counters

Calibration Category $q$	Calibration Counter $c_q$
1	1
2	0
3	0
4	1
5	0
6	0
7	0
8	1
Epoch Counter	3

Q5  
cmtd.

[0076] Each calibration counter  $c_q$  records the number of training cycles (block 816) completed using a calibration battery of the associated calibration category  $q$ . The epoch counter is the sum of the calibration counters and tracks the total number of training cycles completed for the particular model of battery 102. The calibration counter  $c_q$  and the epoch counter are updated in block ~~1022~~ 918 of Figure ~~10~~ 2, as described below.

Please amend paragraph [0085] as follows:

Q2

[0085] If the current calibration battery is not the first calibration battery (i.e. step 908 detects a non-zero value in the epoch counter) then only one of the points which defines the membership functions which correspond to each parameter may need to be changed. This is because the points which define the membership functions have already been scaled. Which one of the plurality (nine in the example being described here) of points which define the three membership functions associated with each parameter is scaled depends upon the calibration category to which the current test battery has been assigned. The point to be scaled is the same point identified in Table VI V. A new value for the point is obtained as a weighted average of its current value and the

Preliminary Amendment re: 09/933,743

Page 5 of 15

parameter value for the current calibration battery. The new value for the point obtained in block 914 may be calculated using the following equation:

Al

$$x_{new} = \frac{c \times x_{old} + [(1-z)x_{old} + zy]}{c+1} \quad (7)$$

where  $x_{new}$  is the new value for the point,  $x_{old}$  is the existing value for the point,  $z$  is the ratio of equation (4);  $y$  is the parameter value measured for the calibration battery; and  $c$  is the value of the calibration counter of Table V IIIa for the calibration category  $q$  of the current test battery (as determined in block 902).